SINGAPORE, MICHIGAN, A BURIED COASTAL GHOST TOWN: A GEOGRAPHICAL CASE STUDY AND ENVIRONMENTAL HISTORY OF MID-NINETEENTH CENTURY MICHIGAN

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ABSTRACT

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Michigan's landscape has undergone significant alterations due to human activities during the nineteenth century. By the mid-nineteenth century, Michigan had become a leading lumber producer in the United States. However, by the turn of the twentieth century, the logging industry shifted from the East Coast westward. This led to fragmented landscapes, the result of interactions between the logging industry decision-makers, regional policymakers, and wood product consumers. Not all Michigan communities were equally affected by the logging boom. Some landscapes, like those around Singapore, Michigan, were transformed so significantly they were no longer economically viable. Using the photographic record, this research explores the concept of settlement abandonment due to natural resource depletion. It contextualizes the images with narratives that identify the motivations and actions of key players in the logging industry around Singapore and assesses the impacts of the logging industry on the environment and community. These materials suggest that a combination of rampant demand for lumber, a lack of government regulation, and an indifferent local population led to the decimation of the forests surrounding Singapore. Due to the pressures put on the landscape as a means of profit, this area has been forever altered.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

"Environmental history is sometimes about power, sometimes about place, occasionally about space, and more rarely about all three, but it is always about nature" (Stroud, 2003).

The pineries of the Great Lakes region were the source of economic prosperity for early European settlers. White pine and later hardwood trees provided the wood products and the financial fuel for Western Expansion during the 1800s (Stearns, 1997). Settlers chose logging practices that optimized financial gain over sustainability, leading to negative consequences for the health and viability of Michigan's forests.

The dichotomy of the rich expanses of forest and the barren land left from logging are chronicled in Alex Tocqueville's *Two Weeks in the Wilderness* (2003). Describing pristine forests, he writes, "The traveler comes to a halt and looks; the trees of the forest huddle together, their branches intertwined, seem simply to form an entire whole, a huge and indestructible building, beneath whose vaulting reigns an everlasting darkness." The barren landscapes that remained after logging stand in stark contrast to "Only the gaunt stumps of the former pines, frequently with their root systems fully exposed as a result of the consumption of the topsoil by fire, remained to indicate that the area was once a forest rather than a perpetual barren" (Curtis, 1959).

Environmental history is one approach to understanding the interconnectedness of human and environment interactions that lead to abandonment. This approach to understanding abandonment can improve public understanding of contemporary environmental issues, such as natural resource depletion by placing them in a broader historical context (Cronon, 1993). Many works explore the environment of the western United States, and others review the beginning of our nation. However, few works regarding the Great Lakes have been written. For the most part,

what has been written has been relegated to potions of book chapters. Anne Kelley Knowles mentioned the Great Lakes region in *Mastering Iron: The Struggle to Modernize an American Industry, 1800-1868.* In *Nature's Metropolis,* William Cronon discussed the making of Chicago in which the Great Lakes region as a whole is referred to often. *Down to Earth* by Ted Steinberg, had a chapter on commodities where lumber and the Great Lakes region had a section. These authors and books represent the work that has been completed regarding the environmental history of the Great Lakes.

Co-evolving factors such as technological advancement and socioeconomic development led to the exploitation of Michigan's forests (Hupy & WinklerPrins, 2005). The State of Michigan began selling acreage of land to speculators for as little as $0.75 to $1.50 per acre by the mid-1800s. The negative outcome of exploitive logging practices of this era were not limited to the forests. Settlements that grew out of the logging industry also fell victim of their own greed leading to their abandonment.

Settlement abandonment is commonly used to refer to the absence of evidence for habitation of any magnitude or duration in a site of previous habitation (Nelson & Schachner, 2002) and is typically the outcome of a land-use strategy, not the product of failure (Nelson & Hegmon, 2001). The ruins of abandoned settlements are one of the most enduring and complex representational devices in western tradition (DeSilvey & Edensor, 2013). These landscapes are the outcomes of historical relationships between humans and the environment and can be recorded through both text and visual formats, such as images and maps. For this reason, visual methodologies are useful for understanding these landscapes. Photography has been used to document and interpret a variety of socio-environmental phenomena including rural town life cycles (Holcomb et al., 2020), vegetation change under agricultural abandonment (Hendrick &

Copenheaver, 2009), and the impact of climate change on rural America (Herrmann, 2019). Photography on its own is not sufficient for understanding the events that led to the observed landscape, historical context is necessary to guide interpretation of these materials.

This thesis takes an environmental history approach to studying settlement abandonment caused by natural resource depletion. A visual methodology is applied to visual artifacts including historical photographs and maps of the city of Singapore, Michigan and complemented with a content analysis of historical narratives. The interpretation of these artifacts is guided by a theory of abandonment presented by Riis (1973).

2. METHODS

Photographs can illustrate the past, offer a widely accepted form of communication for the present, and are an important reference for the future (McLaughlin, 1989). The use of imagery, such as photographs, can be a powerful tool in understanding the language of landscape analysis and interpretation (Keeling, 2020). Photographic images function as records of people, events, and places. They evoke ideas or emotions in ways that words alone cannot (Hung & Laubach, 2009).

This thesis uses the cycle of site abandonment as a starting point for interpreting the visual and textual materials regarding Singapore, Michigan. This framework was developed by Riis (1973) to frame a visual interpretation of the historical photographs related to the failure of Walhachin. Through an examination of cultural and environmental factors, Riis evaluated settlers' behavior patterns to identify and understand the factors that determined the potential for a successful settlement. He explored variables that influenced the failure process in Walhachin that could be fit into a model that could be used to analyze other settlements. Riis discovered that these variables could be found in any settlement to a greater or lesser degree (Riis, 1973). By applying this model to Singapore, Michigan, this research was able to utilize these factors to understand the process of settlement abandonment.

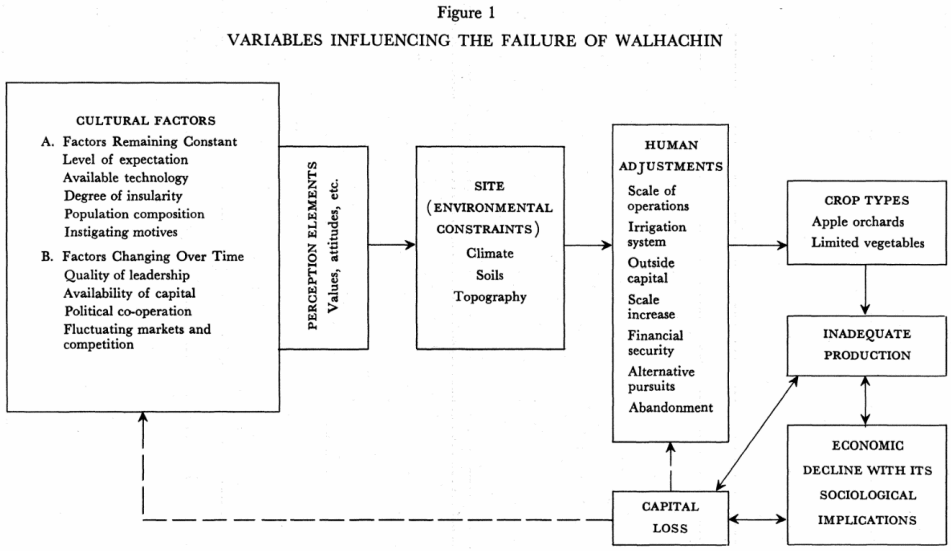

Figure 1. Riis (1973) model of variables influencing the failure of Walhachin

The cultural factors that were studied included the level of expectation of the lumbermen, the town members, and the landowners, and their motives. The availability of timber, the technology they had, and fluctuating markets were changing cultural factors that were explored. The perceptual elements are views and attitudes that served as a filter through which the lumbermen, the townspeople, and business owners viewed the landscape and then proceeded to act upon it. Site conditions incorporated the environmental constraints in place that affected the efficacy of the town. Human adjustments, according to Riis (1973), were the most critical in an examination of a frontier settlement. They demonstrate the problems that confronted the settlers and how they dealt with these issues.

2.1 KEY DATA

Visual materials including maps, photographs, personal narratives, and newspaper articles were analyzed to meet the objectives of this research. Initial data collection was carried out during

the spring and summer of 2019. Materials related to the town of Singapore were collected from libraries across Michigan including the Bentley Historical Library at the University of Michigan in Ann Arbor, the State of Michigan Library in Lansing, the Allegan District Library in Allegan, and the Clarke Historical Library at Central Michigan University in Mt. Pleasant. Additionally, the Saugatuck-Douglas Historical Society was also instrumental in material collection.

2.1.1 Newspaper Articles

Three local newspapers were targeted, *The Allegan Journal, The Grand Haven News,* and *The Commercial Record*. Both *The Allegan Journal* and *The Commercial Record* were published in Allegan County. *The Allegan Journal,* published weekly in Allegan, Michigan from 1856 to 1882. There were not any articles identified from *The Allegan Journal* that were within the scope of this work. *The Commercial Record,* produced in Saugatuck, Michigan, was established in 1868 and is still in production today (Lane, 2018). *The Commercial Record* was searched from 1868 until 1881, however, after 1872, there was no longer any mention of Singapore. *The Grand Haven News* was published every Wednesday morning from 1858 until it folded in 1908.

Table 1. Newspapers utilized for content analysis.

Newspapers	**Article Title**	**Date**
Grand Haven News	Excursion to Newark	August 1859
The Commercial Record	West Coast Lumbering has Roots in Allegan County	December 1970
The Saugatuck-Douglas Historical Chronicle	Singapore Swallowed By Sand	June 2018

2.1.2 Physical Surveys

Two archeological surveys were collected for this research. The *Cultural Resources and Land Use History Background Report on an Approximately 300-acre Parcel Located in Saugatuck Township in Allegan County, Michigan* is shortened to "Historical Survey Report" throughout the coding process. This survey was completed in 2017 in response to efforts to develop the dunes over historic Singapore. The other survey, *Saugatuck Historical Coastal Survey Report*, was completed in 2010. The objective of this 2010 Coastal Survey was to develop an action plan to protect significant places from development (Kidorf et al., 2010).

Table 2. Surveys utilized for content analysis and visual interpretation.

Survey	**Source**
Historical Survey Report	McGowan 2017
Saugatuck Coastal Survey	Saugatuck Dunes Coastal Alliance 2010

2.1.3 Photographs

Six photographs collected from *A Photographic History of Saugatuck, Michigan,* a photo book by James Schmiechen, the Saugatuck-Douglas Historical Society's collections, and GreatLakesEcho.com.

Table 3. Photographs utilized in this study for content analysis and visual interpretation.

Photographs	**Source**
1880 photo	Schmiechen & Kemperman, 2003
1910 Old House near Singapore	Schmiechen & Kemperman, 2003
1938 Singapore	Kreager, 2014
Johnson & Stockbridge Sawmill	Schmiechen & Kemperman, 2003
Shacks on the Kalamazoo River	Saugatuck Douglas Historical Society
Sawmill at Singapore	Saugatuck Douglas Historical Society

2.1.4 Maps

Maps depicting Singapore were collected for the time between 1836 and 1903. The earliest map was created by Oshea Wilder in 1836, the intention of his hand-drawn map was to provide investors with the layout of their investment. A hand drawn plat map of the city found with the 1939 tax record was also collected. *The 1873 Atlas of Allegan County* by D.J. Lake, *Allegan County Historical Atlas and Gazetteer* by Kit Lane, were utilized for their maps and description of the local area. There are maps of Allegan County in 1873 showing Singapore plotted, at the county, township, and village level. This plat map of Singapore contains street names and house locations. Additionally, the *1895 Allegan County Atlas* compiled by Kace Publishing Company. Finally, Lyon and Sibley's land survey and 1903 was the first navigational chart that no longer showed Singapore as a point of reference.

Table 4. Atlases collected for this research.

Atlas Title	Author	Year
1873 Atlas of Allegan County	J.D. Lake	1873
Allegan County Historical Atlas and Gazetteer	Kit Lane	1998
1895 Allegan Atlas Saugatuck Township	Kace Publishing	1895

Table 5. Maps collected for this research.

Map Title	Author	Year
Michigan Land Cover	Lyon & Sibley	1831
Hand drawn map from tax records	Unknown	1839
Survey Plat Map	General Land Office	1850
Saugatuck Township	J.D. Lake	1873
Nautical Chart	NOAA	1877
Michigan Coastal Navigation Charts	NOAA	1895 & 1934
Lake Michigan and Saugatuck Harbor	Army Corps	1919 & 1934

2.1.5 Personal Narratives & Local Histories

Few first-person accounts of life in Singapore exist. Two of these narratives were identified for this research. Francis May Heath and Henry Hudson Hutchins wrote of the days they spent growing up around Singapore, Michigan. *Early Memories of Saugatuck, Michigan* by May Francis Heath was a digital scan from Bentley Library in Ann Arbor, Michigan. Francis May Heath's grandparents were among the first settlers of the area. Her grandfather was Stephen A. Morrison, who came to the area with Horace H. Comstock in 1833. Mr. Morrison ran the first lighthouse at the mouth of the Kalamazoo River and his wife, Mary Peckham Morrison, was the first schoolteacher in Singapore (Heath, 1930).

The second narrative *Western Allegan County Pioneer Days* by Henry H. Hutchins was a book he wrote from letters and memories gathered from those living in the area in and around Singapore. Henry Hudson Hutchins who, in 1853, was born in Ganges Township, near Singapore. Hutchins father worked in many trades in and around Singapore, including roadbuilding, logging, and mill construction. His mother was the mistress of the Singapore boarding house from 1848 to 1849, shortly after her marriage (Hutchins, 1919).

Local county and village histories, written during the period of time that Singapore was in existence are also used in this analysis. Charles Tuttle's 1874 history of Michigan and the history of Allegan county presented by Chrisfield Johnson, while written toward the end of the lifecycle of Singapore, provide accounts that are near in time.

Table 6. Personal narratives and timely histories written about Michigan, specifically Singapore

Book	**Publication Date**
General History of the State of Michigan, With Biographical Sketches, Portrait Engravings, and Numerous Illustrations. A Complete History of the Peninsular State from Its Earliest Settlement to the Present Time by Charles Tuttle	1874
History of Allegan and Barry Counties, Michigan: With Illustrations and Biographical Sketches of Their Prominent Men and Pioneers by Chrisfield Johnson	1880
Western Allegan County Pioneer Days by Henry H. Hutchins	1919
Early Memories of Saugatuck, Michigan by Heath, May Francis	1930

2.2 LITERATURE

Environmental history can profoundly inform public understanding of contemporary environmental issues by placing those issues in a broader historical context (Cronon, 1993; Crosby, 1995). Scholarship in environmental history often demonstrates how histories of human societies and the natural world are intricately enmeshed (Stroud, 2003). According to Riis (1973), human adjustments are functions of the problems. In Singapore the human adjustments include lack of government regulation on the logging industry, scale of operations (the lumber industry grew until the lumber was exhausted), financial security (the town could only sustain itself while there was enough lumber to harvest), alternative pursuits (shipping), and the final, ultimate human adjustment, abandonment.

One form of abandonment is due to environmental degradation resulting from interactions between cultural and environmental factors. Armstrong (2011) suggested that ruins could be used to understand abandonment, that they become a part of the landscape through the process of destruction, decay, and abandonment, and that their stories are told through their accumulated histories.

There are several examples within the environmental history literature of abandonment due to natural resource depletion. For example, Cronon weaves together a narrative that integrates physical geography and Kennecott's cultural geography, showing readers how the two have evolved together throughout history Kennecott (Cronon, 1992a).

DeSilvey and Edensor (2013) suggest a ruin emerges through the process of abandonment as a symbol of either failure or of growth. Clearly, in the case of Singapore, the ruin was the result of exploitation and which led to failure. Armstrong (2011) suggests places that had been abandoned are not necessarily locations of mourning and lament, but possibly signs of prosperity. A number of examples of site abandonment are chronicled in environmental history literature.

The town of Bridal Veil, Oregon, established in 1886 by the Bridal Veil Lumber Company, was one of the first paper mills on Bridal Veil Creek (Davidson, 2008). Another town, Palmer, located a mile and a half up the river, was established in conjunction with Bridal Veil (Hamell, 2011). These towns were created to harvest the lumber on Larch Mountain in the Columbia River Gorge. Lumberjacks would haul the raw logs to Palmer where they were run through the sawmill. They then sent the rough-cut lumber down a two-mile-long wooden water flume. The planing mill by the railroad tracks in Bridal Veil would then finish the lumber (Davidson, 2008).

In 1936 timber was running out and a subsequent fire at the planing mill ended Bridal Veil Falls Lumber Company's operations. Palmer closed down in 1936 (Hamell, 2011). However, a

company that made wooden cheese boxes for Kraft Food Company bought the entire town of Bridal Veil in 1937. At its height, Bridal Veil had several houses, a post office, a two-story school, a church, and a cemetery. This operation ceased in 1988 (Davidson, 2008).

Melmont, Washington was a coal-mining town along the Carbon River. It was established by the Northwest Improvement Company, a subsidiary of the Northern Pacific Railway, in 1900. When the mines began operation, coal was sent to Carbonado, four miles north, for processing. The mines were in operation for sixteen years and produced four percent of Pierce Counties' total coal production, equaling 900,000 tons of coal (*Ghost Town of Melmont Pierce County Washington*, 2012; McDonald, 2002). The demise of Melmont came when the railroad switched from steam to diesel, around 1918. At this time, the need for coal came to an end. The town consisted of a hotel, saloon, a butcher shop, train depot, a post office, several company houses, and a powder house where dynamite was stored. Today all that remains are old rock walls, dynamite storage rock walls, and the school basement ruins (*Ghost Town of Melmont Pierce County Washington*, 2012; McDonald, 2002).

Rhyolite, Nevada was established in 1904 when Shorty Harris and E.L. Cross found quartz on the hillside. A townsite was laid out and given the name Rhyolite from the silica-rich volcanic rock in the area. The area became known as the Bullfrog Mining District because the rock found throughout the region looked greenish, and was spotted with big chunks of yellow metal, resembling the back of a bullfrog. Rhyolite stood out because of the tremendous value tethered to the ore samples. The traces of gold found in ore coming from the Bullfrog-area mines were known to bring in $16,000 per ton, translating to approximately $450,000 by modern standards (Limerick & Klett, 1992). The most promising was the Montgomery Shoshone mine.

The town immediately boomed. Reports on Rhyolite's peak population vary, but up to 10,000 people lived in and around the town by late 1907 (*Rhyolite Nevada*, 2020). A stock exchange and Board of Trade were formed. The red-light district drew women from as far away as San Francisco. There were hotels, stores, a school for 250 children, an ice plant, two electric plants, foundries and machine shops, and even a miner's union hospital ("Discover Rhyolite Nevada Ghost Town Near Las Vegas," n.d.; *Rhyolite Ghost Town - Death Valley National Park (U.S. National Park Service)*, 2015). The epicenter of the Bullfrog Mining District boasted 50 saloons, 35 gambling tables, 19 lodging houses, 16 restaurants, several barbers, a public bathhouse, and the Rhyolite Herald—a weekly newspaper publication ("Discover Rhyolite Nevada Ghost Town Near Las Vegas," n.d.).

In 1906, Charles Schwab purchased the Bullfrog Mining District, including the Montgomery Shoshone mine. He implemented electricity, indoor plumbing, and had a spur of the railroad line run to the area (*Rhyolite Ghost Town - Death Valley National Park (U.S. National Park Service)*, 2015). Schwab also had installed concrete sidewalks, electric lights, water mains, telephone and telegraph lines, daily and weekly newspapers, a monthly magazine, police and fire departments, a hospital, school, train station and railway depot, three banks, a stock exchange, an opera house, a public swimming pool, and two churches (*Rhyolite Ghost Town - Death Valley National Park (U.S. National Park Service)*, 2015). In April 1907 Rhyolite got electricity, and by August of that year, a mill had been constructed to handle 300 tons of ore a day at the Montgomery Shoshone mine. It consisted of a crusher, 3 giant rollers, over a dozen cyanide tanks, and a reduction furnace (*Rhyolite Ghost Town - Death Valley National Park (U.S. National Park Service)*, 2015).

The 1906 San Francisco earthquake, followed by the financial panic of 1907, proved to be the beginning of the end of Rhyolite, as the rail service was seriously disrupted. Over the next few years, mines started closing and banks failed. On March 14, 1911, the directors voted to close down the Montgomery Shoshone mine and mill. In 1916 the light and power were finally turned off in the town. ("Discover Rhyolite Nevada Ghost Town Near Las Vegas," n.d.; *Rhyolite Ghost Town - Death Valley National Park (U.S. National Park Service)*, 2015; *Rhyolite Nevada*, 2020).

The only things that remain today are the railroad depot, the ruin of the Cook Bank building, the Porter Brothers store, the school, and the John Kelly bottle house that was built in 1906 out of over 50,000 beer and whiskey bottles (*Rhyolite Nevada*, 2020).

More recently, Pine Valley, Oklahoma was established in 1927 as a lumber town. It had a large hotel, general store, drug store, post office, barber shop, doctor, school, boarding house, movie house, ice plant, jail, churches, and over one hundred houses. The population was approximately 1500. During the Great Depression, Pine Valley filed for bankruptcy. When the economy rebounded, Pine Valley consolidated with another operation and began operations again in 1936. However, by 1941 all the unusable timber in the area was cut and Pine Valley shut down for the final time ("Pine Valley and the Oklahoma & Rich Mountain Railroad," 2020; Standridge, 2017). Today nothing remains other than some concrete foundations and the rise from the old railroad bed. In 1953 most of the buildings were removed and those that could be salvaged were moved to other operations in Wright City (Standridge, 2017).

Abandonment has been viewed as a strategy for addressing a range of external and internal factors, including climate change, environmental degradation, social stress and conflict, and ideological change and may be seen as failed attempts to address changes in the natural environment and the social realm, or as strategies in response to changes DeSilvey & Edensor

(2013) stressed as part of long-term land use (Nelson & Schachner, 2002). Abandonment is an environment that, once a quantity of a particular resource has been exhausted, the settlement that it supported can no longer continue. As such, these sites often exhibit an absence of order (Baker, 1975; DeSilvey & Edensor, 2013; Riis, 1973).

A geography-focused approach to ruination could take one of several forms (DeSilvey & Edensor, 2013). First, emerging approaches in historical and cultural geography offer critical tools for situating ruins in their spatial, historical, and cultural contexts. Second, geography's interest in the temporal and material may be useful in theorizing the process of ruination and exploring the unstable and fluid entities that make and unmake the ruined form. Third, an emphasis on studying the process of ruination by drawing on current research into embodied geographies, might moderate the overriding focus on the visual in ruin scholarship and focus attention on the ways in which the material qualities of ruins afford particular sensual and affective experiences. Finally, research could develop a more sustained understanding of how ruins are incorporated into networks and assemblages, by exploring relationships between the ruins and the infrastructures surrounding them.

Images are ubiquitous in society. Photographs represent an important source. They are considered concrete and specific, as images that show things exactly as they are seen with the naked eye (Banks, 2018). While it is clear that photographs alone provide insufficient information, they do contain important, oftentimes vital information that would not otherwise be available to the researcher (Borchert, 1982). According to Leeuwen & Jewitt (2001), images are produced to serve as records of reality, and as a documentary evidence of people, places, things, actions, and events. Their analysis is a matter of extracting information from them. Rose concurs and adds that from the beginning, photography has been seen as a technology that simply records the way things

really look (Rose, 2016). McLaughlin (1989) agreed and said that historically speaking, photography has come to "function in society as a communicator to coordinate, control, and transmit all manner of information." Like other forms of communication that have promoted the development of in situations and human relationships, photography has also aided in the teaching of skills and accumulation of knowledge.

Recently interest has grown in performing qualitative research which focuses on visual images. This form of research is not new but has its roots in anthropology and sociology (Pauwels, 2010; Rose, 2016; Rouse, 2013). There are several categories of visual data including maps, diagrams, photographs, video footage, collages, and drawings. They can be used alone or in combination with verbal or written data (Banks, 2018; Rouse, 2013). Photographs can be a powerful research tool in that they can illustrate the past, offer a widely accepted form of communication for the present, and are an important reference for the future (McLaughlin, 1989). Plus, photographs are considered concrete and specific, as images that show things exactly as they are seen with the naked eye (Borchert, 1981).

With the introduction of documentary photography, a door was opened for scholars to use photographs as a unique and legitimate source of social and cultural evidence, able to cast additional light on the past and the study of history itself (McLaughlin, 1989). As such, those who study historical issues must rely on images that were recorded by others. Often these prints have little or no other surviving information about either the content or context of the picture. As a result, it is necessary for a researcher to learn as much as possible about each photograph, its content and context. As with any historical source, the researcher must determine how representative the materials are for the study undertaken and in what ways it is representative (Borchert, 1982). In addition, geographers overall have a tradition of seeing landscapes as

palimpsests to help them understand and explain context and change (Keeling, 2020). As such, Keeling continues that the language of imagery in interpretations and representations of landscapes become an important element of "reading" both the physical and cultural fragments of the past.

Pauwels (2010) suggested that found materials such as photographs should be taken advantage of, that these images and visual artifacts are ubiquitous and produced without any research effort, resulting in huge data repositories of actual and historic documents and photographs, and have become more accessible nowadays with network and database technologies. This huge offering of both contemporary and historic material has a highly divergent nature, it may contain "naïve, utilitarian, mundane, or very professional types of visuals spanning and thus offering access to a wide variety of public and private worlds" (Pauwels, 2010).

Pauwels (2010) continued contending that in studying these materials, researchers may acquire insight into the social functions of the culture itself, and also gain access to broader and more profound aspects of the culture being examined. Images often tend to offer a window to the depicted world, but at the same time they invariably constitute cultural artifacts in themselves and may offer a gateway to the culture of the producer and that of the implied audience (Pauwels, 2010).

Not only does studying these materials help gain a certain insight but using visual analysis in the form of photographs and maps allowed this research to see the area in a way that would not have been possible without them. We are constantly surrounded by a variety of visual technologies. All these different technologies and images offer us views of the world; they show the world in visual terms (Rose, 2016). Along with textual study, the photographs and maps used

in this study shaped a clear picture of how the depletion of the natural resource, timber, around Singapore led to the abandonment of the settlement.

2.3 APPROACH

Following the model of abandonment by Riis (1973) these include level of expectation (what was expected to occur with the endeavor), relevant experience (of people involved in the endeavor), relative location, quality and quantity of land, and availability of capital (Figure 1).

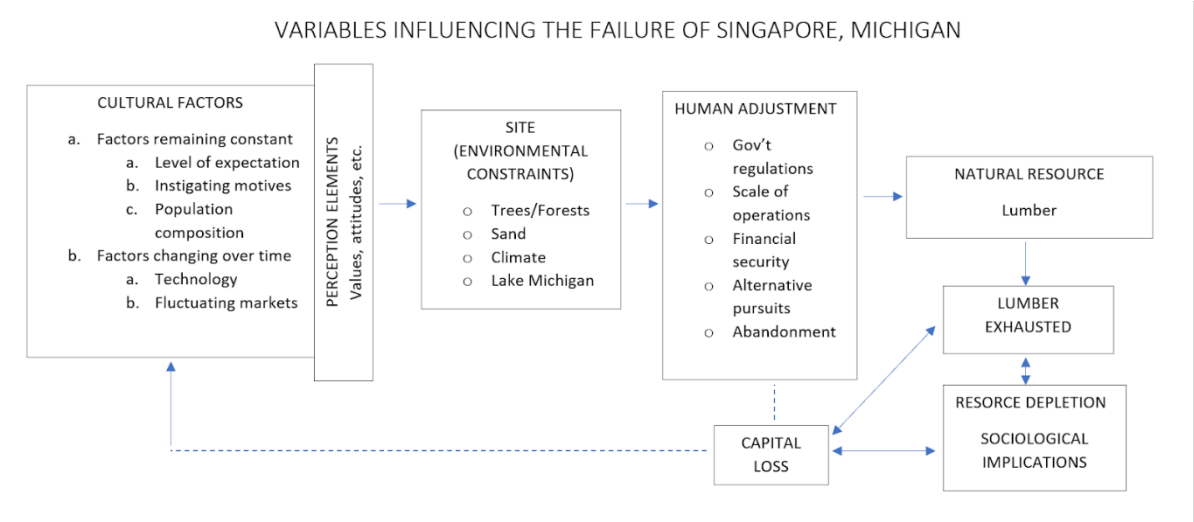

Figure 2. Model adapted from Riis, 1973 to aid in understanding the settlement abandonment that was Singapore, Michigan.

The first variables explored were the cultural factors. These factors are separated into those that remain constant over time and those that change over time. In the case of Singapore, the factors that remained constant included the level of expectation (what/how much were the lumbermen expecting to get out of Singapore), instigating motives (what brought them to Singapore), and the population composition (composed mainly of lumbermen and their families).

The cultural factors that fluctuated were the technology used to increase lumber production and the growing markets. Both factors were positive influences.

Perceptions are the values and attitudes that served as a filter through which the individual or group viewed the landscape and then proceeding to act upon them (Riis, 1973). In Singapore, those values and attitudes both centered around lumber. The town was established solely for the purpose of cutting lumber and shipping it off to the consumer in need (Lane, 2010).

2.4 LANDSCAPE CONTEXT

2.4.1 Physical Environment

In 1831 the land around Singapore was mapped in preparation for sale and settlement, just before the logging era began (Albert & Comer, 2008; Lane, 2010). Lucius Lyon and Sylvester Sibley traveled to the mouth of the Kalamazoo River to begin mapping (Albert & Comer, 2008). On their map of Township 3 North Range 16 West, where Singapore was to be located, they described the landscape of sand dunes closest to Lake Michigan having very little pine. Their field notes read of the future site of Singapore, “Sandbanks. No timber, poor soil” (Albert & Comer, 2008).

East of Lake Michigan, over the sand dunes, the trees were described as aspen, hickory, beech, dogwood, and sugar maple (see figure 3 below). There was pine on sections 11 and 14, white oak on sections 1 and 2 (Albert & Comer, 2008; Lane, 2010). Henry Thomas (1907), in his *Atlas of Allegan County*, described the area as "sandhills 80 to 100 feet high" south of the village on the peninsula and "sandhills 50 to 60 feet high" between the Kalamazoo River and Lake Michigan (Thomas, 1907). In a letter Wilder wrote to Knowles Taylor, Wilder states the plot of

land that was Singapore: “west half of the town plot is a handsome plain inclined to the river. The east part is a hill and covered with timber” (Lane, 2010).

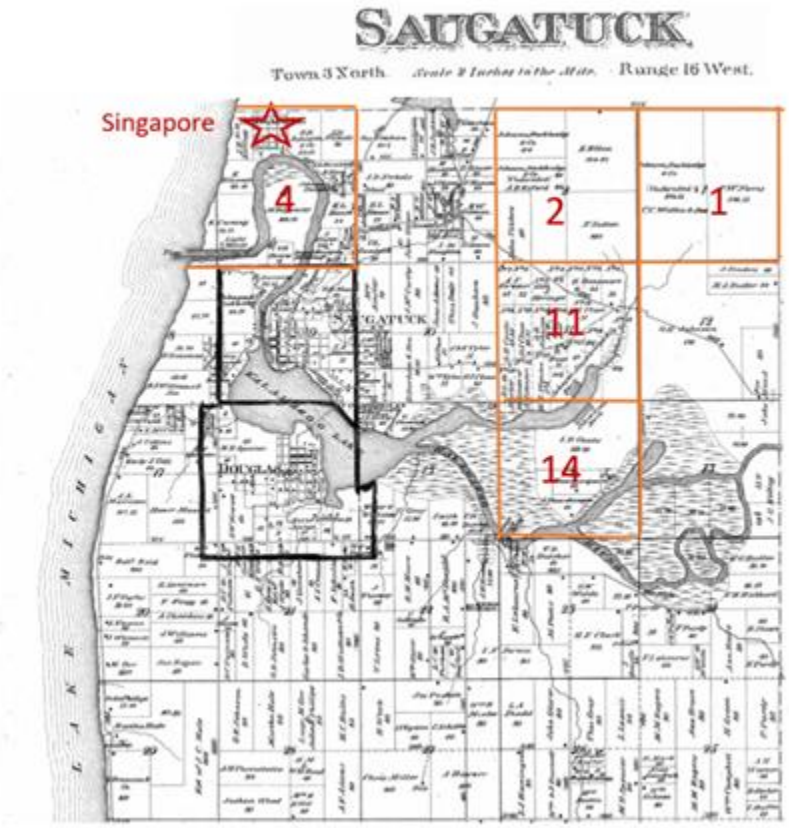

Figure 3. Map of Saugatuck Township. Sections 1, 2, 4, 11, and 14 highlighted to indicate the location of good lumber per Albert and Comer 2008. (Map Source: 1873 Atlas of Allegan County, Michigan).

There was not less than 20,000,000 acres, or one-half the area of the State, was initially covered with pine (Tuttle, 1907). Michigan pine was of superior quality for purposes of lumber. It floated high on the water and was known for its excellent quality (Lorenz, 1983). The wood was soft and light enough that it was easily workable with primitive sawmills and simple hand tools, yet it was solid (Cronon, 1992b).

Being on Lake Michigan provided easy access to the densely forested country. The lake's north-south orientation meant that it cut across many different and varied ecosystems. Tallgrass and oak openings gave way to wetter richer forests of elms, basswoods, then maples, hemlocks, and yellow birch. White pine was most numerous on sandy soils where they could form thick glades within common hardwoods (Cronon, 1992b).

The Kalamazoo River Basin is vegetated by a Carollnean Biotic Province, classified by a pre-settlement climax forest of oak-hickory, transitioning into oak-pine climax forest (Veatch & Hassan, 1959).

The closest town to Singapore with a weather station was Holland, Michigan. Holland was approximately ten miles north and slightly east of Singapore, Michigan, with an elevation of 186m. The average annual high temperature is 59°F with the average annual low temperature being 40°F. The average monthly temperature is lowest in January at 19°F, with July having the highest monthly average temperature at 83°F. The average annual precipitation is 36.79 inches with average annual snowfall of 70 inches (*Climate United States - Monthly Averages*, n.d.).

2.4.2 Human Processes

The General Land Office established the township and range system in Michigan from 1816 to 1866. Surveyor's records from these efforts contain information about tree species and size during this time. When compared to modern land records it is clear to see how impactful the logging industry was during the 19th century (Leefers, 2010).

Allegan County was established through an act of territorial council on March 2, 1831 and established as an organized county in 1835. One year later, Singapore, Michigan was established by O'shea Wilder of the New York and Michigan Lumber Company. The county population in

1838 was reported to be 1,469 persons rising to 32,381 by 1874. Prior to settlement by white people, the region was home to the Macsaubee band of Indians (Henderson, 1881).

In 1836 Oshea Wilder purchased land on the northernmost bend of the Kalamazoo River and established Singapore, Michigan for $10,000 (Lane, 2010; Lorenz, 1983). The first sawmill began operation in the Spring of 1837 and was said to cost $60,000, with an additional $25,000 for the machinery (Heath, 1930).

The main economic activity at the time in Singapore was logging. In 1839, Americans consumed 1.6 billion board feet of lumber. Thirty years later, that Figure had risen steeply to 12.8 billion board feet. After 1860, much of that wood came not from New England or New York but the vast forest reserves of the Great Lakes states of Michigan, Wisconsin, and Minnesota (Steinberg, 2013).

Heath (1930) suggested that at this time, common labor brought $16 a month and board. Lorenz (1983) augmented this saying that as of January 1837, laborers were earning $20 per month, and carpenters earned between $1.50 and $3.00 a day including board. Lorenz (1983) described the current price of lumber in May 1836, the price at Chicago being $17.00 per 1000 feet of lumber, mill run. Wilder considered ten to twenty trees of sawing quality per acre above average, fifteen was poor, and one hundred excellent. Each tree yielded an average 2,000 feet of lumber. Fifty trees would yield 100,000 feet of lumber per acre. However, if the land that the timber was on was too far from water, it had no value, except for local use (Lorenz, 1983). Wilder claimed one double mill cut approximately 15,000 feet of lumber every 24 hours and estimated the net profit to be $6.00 per 1000 feet of lumber when sold at Chicago (Lorenzo, 1983).

In May 1839, two rotary engines were put into production in Singapore to increase output. These engines drove six upright and four circular saws. Between May 22, 1839, and June 26, 1839,

the New York & Michigan Lumber Co. cut 307,861 board feet, averaging approximately 14,000 feet per working day (Lorenz, 1983).

Lorenz (1983) wrote that in July 1838, approximately a year after the depression started, T.R. Green of Green, Mitchell & Co. claimed the price of lumber to be $19.50 per 1000 feet at Chicago. Green estimated a high cost of operation at $14.75 per 1000 feet and a low cost of $11.50. The sawmill cutting 20,000 feet of lumber per day would yield between $95.00 and $160.00.

Wood played a significant role in the lives of nineteenth-century Americans similar to plastic and steel today; almost everything was built with wood, from homes to roads and bridges. Its most important use in homes was for heat, but it also served as fuel for powering railroads and steamboats and making charcoal for the iron industry (Steinberg, 2013). Without wood, many things would be impossible to construct, houses, barns, and corn cribs, not to mention churches and schools, as well as tools, machinery, wagons, and fences. No raft, boat, or railroad could be built without it. Without a steady supply of wood, no town could come into being or aspire to become a metropolis (Cronon, 1992b).

Pine is a durable and sturdy wood that is soft enough to be easily worked with even the most straightforward tools making it attractive for building purposes. It also floated on the water, allowing it to be transported easily to distant markets. The central and northern reaches of Michigan, Wisconsin, and Minnesota all contained extensive pine forests as well as many large rivers for floating loads of lumber into the Great Lakes (Cronon, 1992b; Steinberg, 2013).

Fuller (1916) suggested that economical transport of logs and lumber by water was an item of great value in settling Michigan. The cost of hauling logs overland confined early lumbering to the banks of the nearest waterway. The amount of timber that could be easily reached was immense, and considerable amounts of lumber were exported.

The waterpower of the Kalamazoo River made it the great central agent of settlement for the entire area. The uniformity of its volume was due to many feeding springs and equalizing lakes and marshes, which prevented low water from drought, or devastation of the neighboring country in flood time. The power of its current being practically constant, settlements could, with few exceptions, be established close to its banks without fear of floods (Fuller, 1916).

By conceiving such things as water and trees as commodities and putting a price on them, it became possible to manage and reallocate what had now become resources efficiently. Between 1850 and 1890, the explosive growth in the population of the central United States, almost a fivefold increase, spawned much of the demand for wood (Steinberg, 2013).

2.5 CASE: SINGAPORE, MICHIGAN

Singapore has been the subject of much anthropological research, specifically about pre-European settlement sites of importance, as detailed in McGowan (2017). A recent survey of the historical, natural, and archaeological sites of importance in the area was conducted by (Kidorf et al., 2010).

3. ANALYSIS

3.1 PHOTOGRAPHS

Historical geography often uses maps and photographs to examine town boundaries, areas of occupation, and natural resource availability. While photographs show what is happening in one moment of time, maps show what is happening spatially during this time. Comparing photographs and maps show change over time and space. The phrase – a picture is worth a thousand words – suggests that visual imagery as an element of communication can play a powerful role in helping us to understand how the world works (Keeling, 2020). Photographs and maps of Singapore were collected and compared. They were compared for content, what was there and what was not, and the narrative they told, what was happening and why.

The content of a photograph only contains a partial story regarding a place or an event. Within a picture's frame, photographers cannot include all elements they witness (Hung & Laubach, 2009). In addition, photographs always contain a subjective message in addition to the seemingly objective record, and all photographic data reflect not only the photographers' interests but also their biases and assumptions (Papstein, 1990). As a photograph is viewed, interpretation is not always consistent with the original purpose or intention of its producer. Moreover, the same photo can be read and interpreted in different ways by different people (Hung & Laubach, 2009).

Comparing a photograph of a sawmill in Singapore in 1869 (figure 4) to the same area in 1975 (figure 2) an image is created to help us understand what occurred to the town once the lumber had been exhausted. Figure 4 shows a thriving business. The sawmill was in operation evidenced by the steam on the right middle of the photograph. There are piles of lumber waiting to be loaded onto one of the three ships waiting in the harbor. This photo was a typical scene

observed in the lumber industry in the mid-nineteenth century. Just over one hundred years later, in 1975, there was nothing remaining that would suggest a thriving lumber mill once stood on its banks. All that remains is a pile of sand and a few trees.

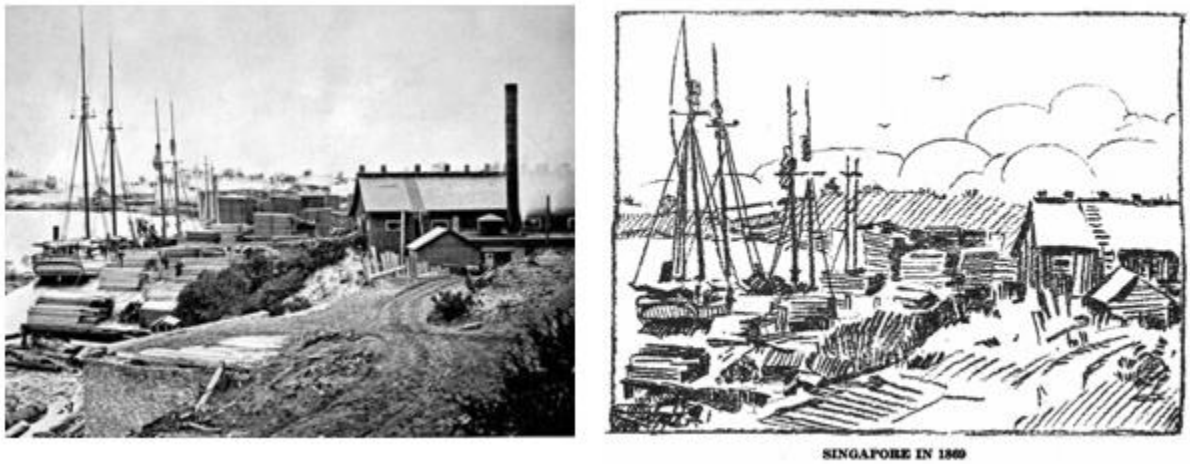

Figure 4. Johnson & Stockbridge Sawmill in Singapore, Michigan, 1869 (Source: Saugatuck Douglas Historical Society, n.d.).

The language of trade and resource distribution is inherently geographic, specific locations are given attributes that facilitate the production of raw materials, agricultural products, and manufactured goods (Keeling, 2020). In addition, in image analysis, the researcher examines the content of photographic images in a search for patterns and meaning (Hung & Laubach, 2009). The following photographs are chronological images of Singapore. As the photographs are examined, the content is inspected for clues as to how each photograph represents the area of study.

In a few of the photographs the town is evident, in most it is not. The story of Singapore was hard and fast. Very few photographs remain of the town itself. Most images show the aftermath of the mass destruction of the forests that once surrounded the town.

The photograph in figure 5 was taken in 1875. It was not of the town itself, but of the Kalamazoo River at the mouth of Lake Michigan. On closer inspection, Singapore is only just noticeable in the background. Figure 6 is the same photograph zoomed in for a closer look bringing the sawmill into view. In this instance, the author was not trying to capture Singapore, but the river itself.

Figure 5. Kalamazoo River at the mouth of Lake Michigan with Singapore in the background, 1875. (Source: *Saugatuck-Douglas Historical Society*, n.d.)

Figure 6. Zoomed in view of Figure 5. In this image the sawmill is more discernible. (Source: *Saugatuck-Douglas Historical Society*, n.d.)

Figure 7 is a photograph that was taken circa 1880 and shows an abandoned harbor with sand moving into the village. This image appears to convey the sense of abandonment. The broken

harbor in the foreground and desolate buildings at the base of a sand dune seem to support this. On the left side of this photograph there appears to be sand encroaching on the buildings and knowing what we know now, this sand eventually buries these buildings. Notice the lack of trees on the sand moving toward the building. However, there is vegetation on the sand dune behind the building. This sand dune is not the one creeping toward the town.

Figure 7. Singapore, Michigan 1880. (Source: *Saugatuck-Douglas Historical Society, n.d.*)

There were little to no photographs left of people in the town of Singapore. This town was a rough lumber town and although there were a variety of people living and working in and around Singapore, there are few pictures of this area. We know there were teachers, bank owners, wives, and children, but there was no photographic evidence of the townsfolk that this research was able to uncover. Figure 8 illustrates what typical lumbermen looked like and the tools, axes and crosscut saws, the men used to cut and harvest the trees. This photograph also shows the size and density of the trees in Michigan forests in the mid-nineteenth century.

Figure 8. Michigan Lumberjacks in the 1800's (Source: Parshal, 2015)

Figures 9, 10, and 11, were taken in the early 1900s and show the effect of deforestation. These pictures act as a reminder as to what happened when the forest around the town was stripped bare. With no vegetation or trees to stop it, the sand moved in and gradually took over the town.

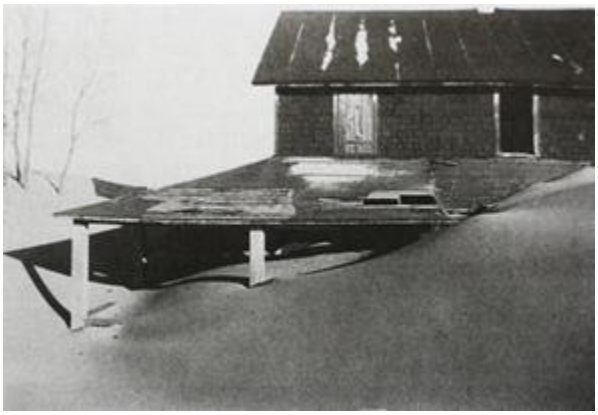

Figure 9. Early 1900's, house in Singapore being buried by sand (Source: Lane, 2010; *Saugatuck-Douglas Historical Society*, n.d.).

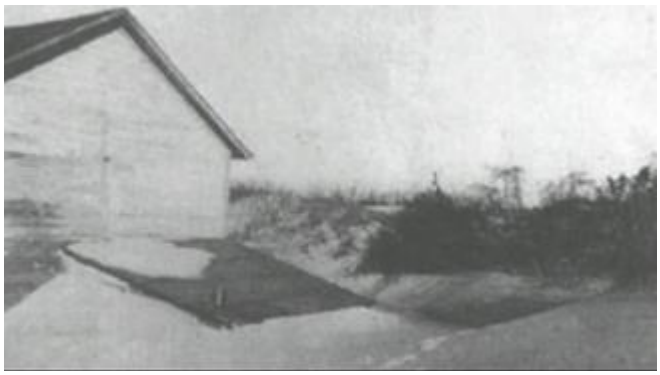

Figure 10. Early 1900's, although there appears to be some vegetation, it was not enough to keep this house in Singapore from being buried by sand (Source: Lane, 2010; *Saugatuck-Douglas Historical Society*, n.d.)

Figure 11. Early 1900's. With no vegetation to protect it, the house was being buried by sand. (Source: *Saugatuck-Douglas Historical Society*)

The photograph in figure 12 (below) was taken around 1910. This was a typical house of a mill worker or fisherman. Notice the abundance of sand and lack of tree cover. At this point, Singapore had been abandoned for approximately thirty-five years.

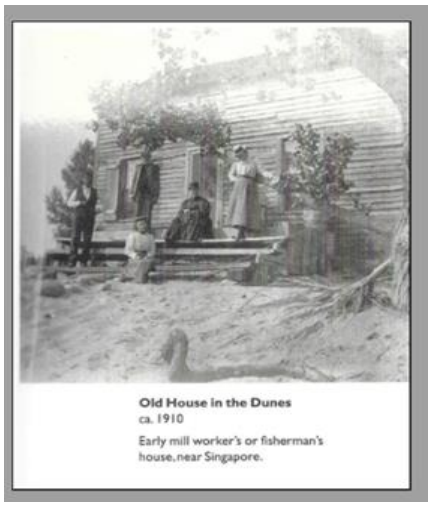

Figure 12. Circa 1910. A house in the dunes near Singapore. (Source: Schmiechen & Kemperman, 2003).

Figure 13 (below) was taken around 1950 and is the same area that is shown in figures 1, 14, and 15. The area has not been built up making it easy to see where the town had been buried under the sand dune. Notice the abundance of sand and lack of vegetation and tree cover.

Figure 13. Singapore, Michigan 1950. (Source: *Michigan History Center*, n.d.).

Twenty-five years later, in 1975, figure 14 showed even more vegetation. The trees are maturing and there appears to be grass and weeds growing along the shore.

Figure 14. Site of Johnson & Stockbridge Sawmill, 1975. (Source: Lane,2010).

The same area was photographed once again in 1993 (figure 15). The trees have grown and there is now a recreation area. There are once again trees, although not near the amount that supported the town in the mid-nineteenth century.

Figure 15. Site of the Johnson & Stockbridge sawmill, 1993 (Source: Lane, 2010).

This final photograph (figure 16) was taken in 2019. While the other photographs were taken from the shore of the Kalamazoo river looking toward Lake Michigan, this photo was taken from the opposite direction, from the shore of Lake Michigan. From this angle we see a few trees and some vegetation. This picture also shows the danger that these dunes still pose. With so little vegetation, these coastal dunes are still active and able to cause more destruction.

Figure 16. View of Singapore, Michigan from the shore of Lake Michigan, 2018. (Source: Michelle Church)

3.2 MAPS

Maps are not the whole of geography, but there can be no geography without them (Bednarz et al., 2006). Visual researchers, geographers and others, have primarily focused on camera-based imagery due to its ubiquity in society, the ease with which the photographs are produced, and the specific iconic and indexical qualities (mostly understood as the high level of ‘‘resemblance’’ and the ‘‘natural’’ or even ‘‘causal’’ relation to the depicted object) (Pauwels, 2010). However, researchers may also take advantage of directly observed aspects of visual

culture, studying and using non photographic representations (e.g., drawings, paintings, murals, graffiti, maps, and charts) (Pauwels, 2010).

The first maps of Singapore were completed in 1831 by Lucius Lyon and Sylvester Sibley prior to the establishment of the town. The first map below, figure 17 A, is a Survey of Saugatuck Township, Township 3 North Range 16 West. The second map, figure 17 B, completed at the same time is a Survey of Islands in Kalamazoo River. In their field notes Lyon and Sibley observe that on the sand dunes closest to Lake Michigan there was not much forest and very little pine. Their field notes read of the future site of Singapore, “Sandbanks. No timber, poor soil.” The trees to the west of Singapore were described as aspen, hickory, beech, dogwood, and sugar maple. There was pine on sections 11 and 14, white oak on sections 1 and 2 (Albert & Comer, 2008; Lane, 2010). Figure 18 maps out the trees as described by Lyon and Sibley. This is the starting point of Singapore, the area, the forests, the land cover.

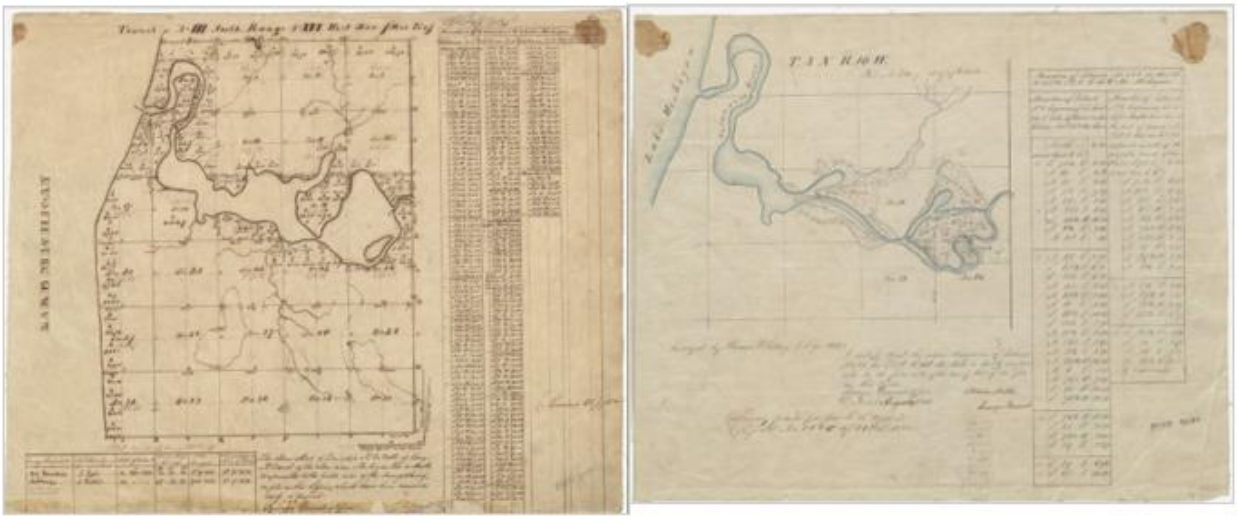

Figure 17. Map A) 1831 Survey of Saugatuck Township by Lyon and Sibley. Map B) 1831 Survey of Islands in the Kalamazoo River by Lyon and Sibley (Source: Bureau of Land Management, n.d.).

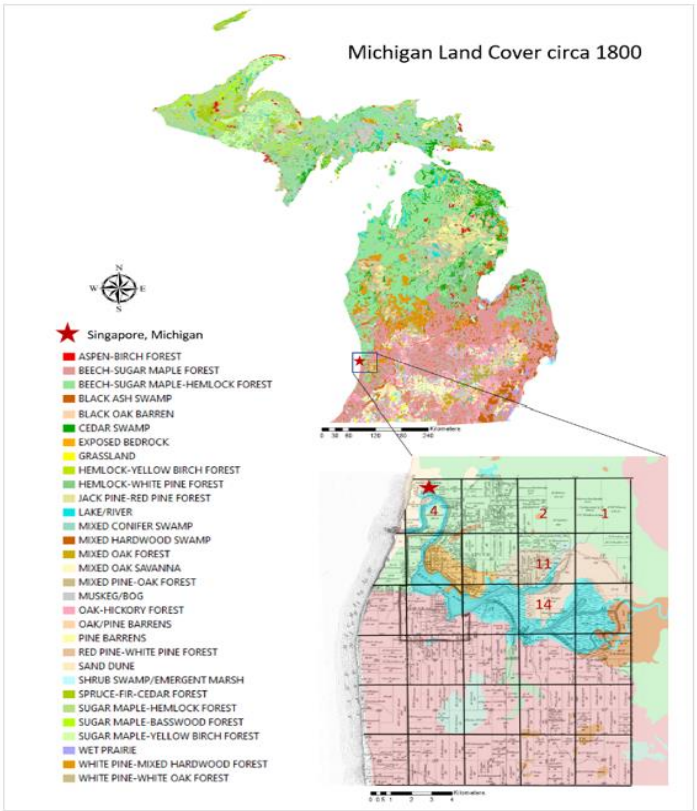

Figure 18. Top map: Michigan land cover circa 1800 as mapped by Lyon and Sibley (Albert & Comer, 2008). Insert: Landcover map overlay the 1873 map of Saugatuck Township. The section numbers are included to indicate what land cover was mentioned in the 1831 land cover survey by Lyon and Sibley (Created by: Michelle Church).

Once people started to move into the area, maps were created to stake claims. Two hand-drawn maps shown in figure 19 illustrate this practice. In figure 19 A Oshea Wilder is describing the proposed site of Singapore. However, in figure 19 B suggesting "Singapore is ours." No one knows who wrote this note. The map however was found in the 1839 county tax file records (Lane, 2010). Hand drawn maps like these below give a unique perspective into the time and circumstances of its creation. For example, in figure 19 A, research has suggested that Oshea Wilder desired the land where the Kalamazoo River met Lake Michigan, however the owner at the time was not willing to sell it (Heath, 1930; Lane, 2010; Lorenz, 1983).

Figure 19 B is intriguing in that no one knows what W.R. Watson's relation to Singapore was other than he was a surveyor from Kalamazoo. Lane (2010) explained that in a list of lands sold for delinquent taxes, Watson's name was found on several lots in Allegan County that he purchased in a tax sale on October 10, 1839. Under tax sale provisions the owner had two years to redeem the lands by paying tax and penalty before the land became the property of the tax sale bidder. On most parcels there is a later note added that the land was "redeemed" (original owner paid the tax and penalty) or "deeded" (a full deed was given to the tax sale purchaser). According to Lane (2010), there was not a designation next to the Singapore lands on the tax list. Lane (2010) suggested that this map was sent to the deputy county treasurer and this personal note was mixed in with official papers.

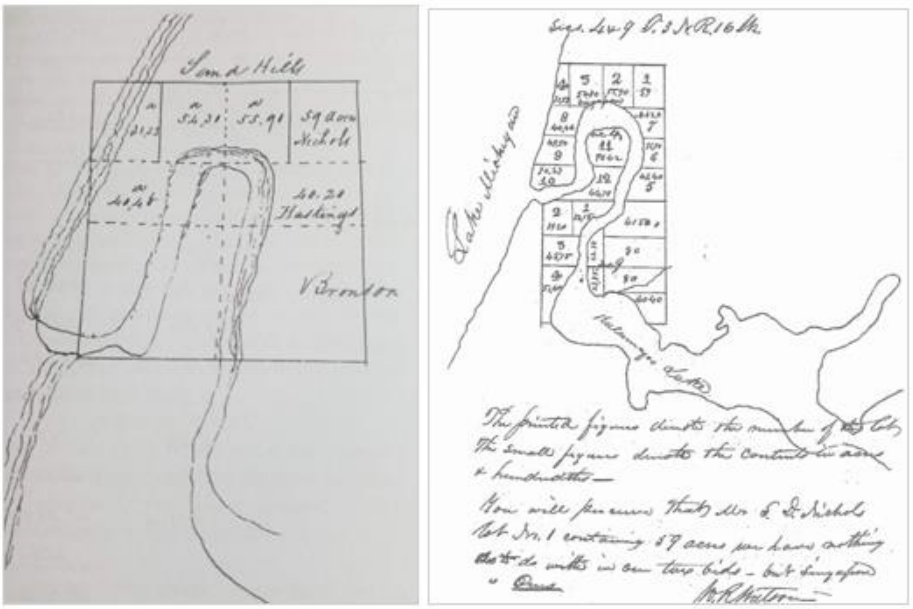

Figure 19. A) Hand drawn map of the proposed site of Singapore, 1836. B) Hand drawn map found in the 1839 county tax file records (Source: Lane, 2010).

The text below the hand-drawn map of figure 19 B reads:

> *"The printed figures denote the number of the lot. The small figures denote the contents in acres and hundredths – You will perceive that Mr. S.D. Nichols lot No. 1 containing 59 acres we have nothing to do with in our tax bids – but Singapore is Ours." W.R. Watson*

Studying maps such as these hand-drawn examples gives an insight into the culture of the mid-nineteenth century. The area was drawn out and documented. From a note to investors to a possible tax land sale.

In this 1838 map of Singapore (figure 20), the town is laid out. Streets are labeled and the sawmill location is presented in the lower left along the Kalamazoo River. This map demonstrates the ambition and confidence in building this town. The note on the right side of the map reads:

> *The lots are 25 ft. wide by 30ft. deep except the north range of lots aforementioned being about 140 feet long and the range of lots on the west side of the Platt are also fractional. The lots on block 26 are 23ft by 82feet. Those in block 25 are bounded on the south by the River and are all 25 feet wide except lots 13 & 14 which are 30 feet on the front. Block 27 containing 3 acres, owned by the New York & Michigan Co. on which a Steam Sawmill is now erecting. The streets are 60 feet wide, except Broad and River Street, which are 80 feet wide and the alleys are 45 ft. wide. Scale, 2 chains or 132 feet to an Inch. Singapore, February 1838*

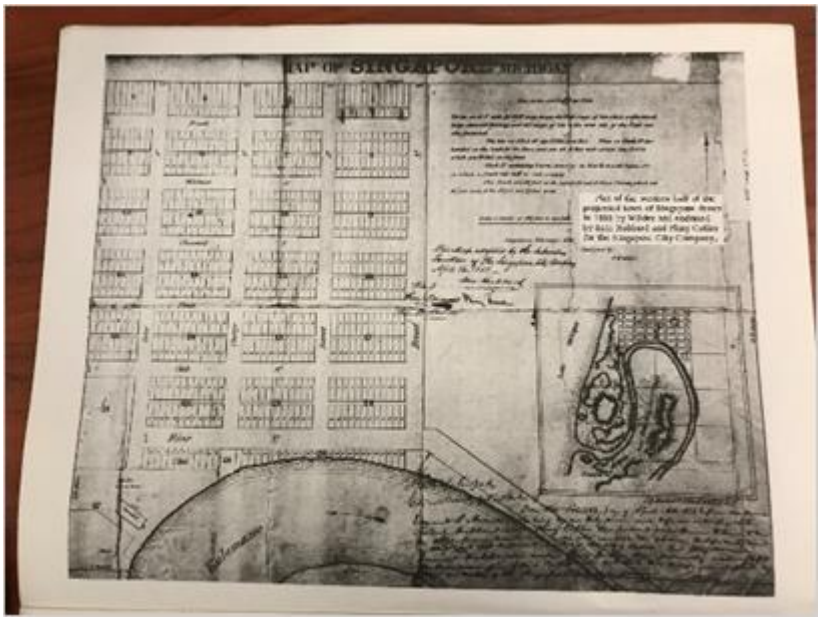

Figure 20. Map of Singapore, Michigan, 1838 (Source: *Saugatuck-Douglas Historical Society*, n.d.)

In some maps Singapore is included (figures 21, 22, 23, 24, 25, 26, and 29) and in others it is not (figures 27, 28, and 30). On the maps that Singapore is included, figures 25, 26, and 29, the town had already been deserted, but was still included. Figure 29 are the most recent maps to include Singapore and are dated 1919 and 1934.

Figure 21 (below) is an example of a regional map that included Singapore, Michigan. This regional map was created in 1844 and included several counties including Ottawa, Kent, Ionia, Barry, Calhoun, Kalamazoo, Van Buren, and Allegan Counties. This map incorporated the major rivers and cities of the region.

Figure 21. Regional map, 1844 (Source: *Saugatuck-Douglas Historical Society*, n.d.)

The maps in figures 22, 23, and 24 were included in the 1873 Atlas of Allegan County. The maps start out regional (figure 22), move to township level (figure 23), and conclude with the town of Singapore plotted out in figure 24. These three maps indicate that Singapore was an active town with streets, houses, and businesses.

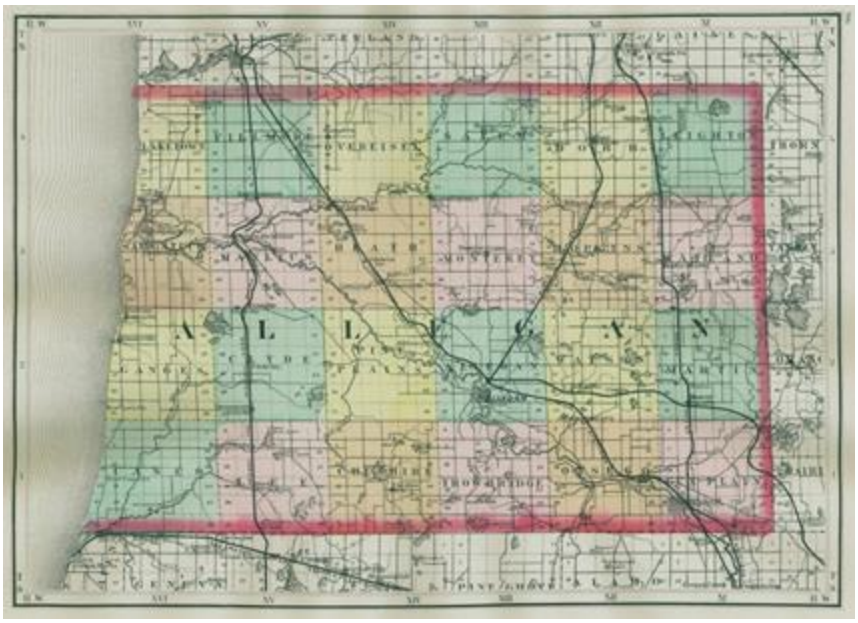

Figure 22. Allegan County map of 1873 (Source: Walling, 1873).

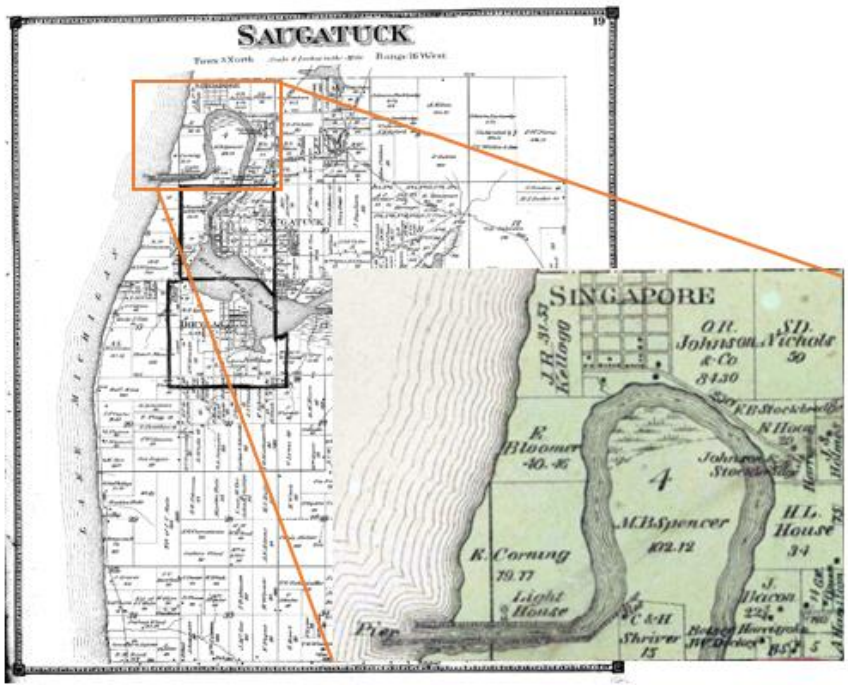

Figure 23. Map of Saugatuck Township, 1873 (Source: Walling, 1873) and zoomed in view of Singapore on the Map of Saugatuck Township. (Source: *Saugatuck-Douglas Historical Society*, n.d.)

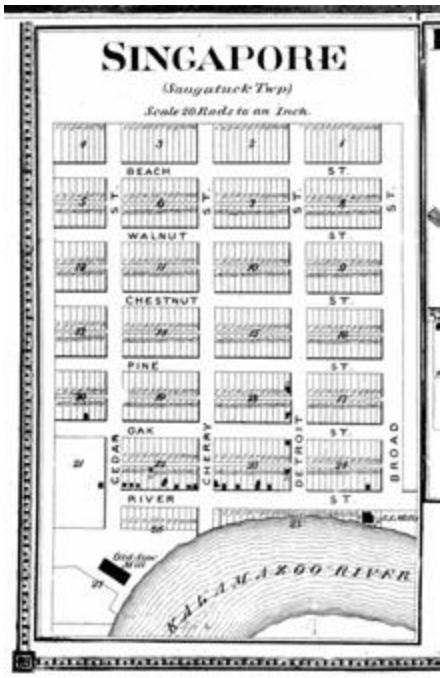

Figure 24. Plat map of Singapore, Michigan, 1873 (Source: Walling, 1873).

Figure 25 is the earliest nautical map collected. This map consisted of Lake Michigan from South Haven to Grand Haven with a second map showing a zoomed in view of Singapore. This map was created in 1877. Singapore was not named, but there are building footprints indicating where Singapore once stood.

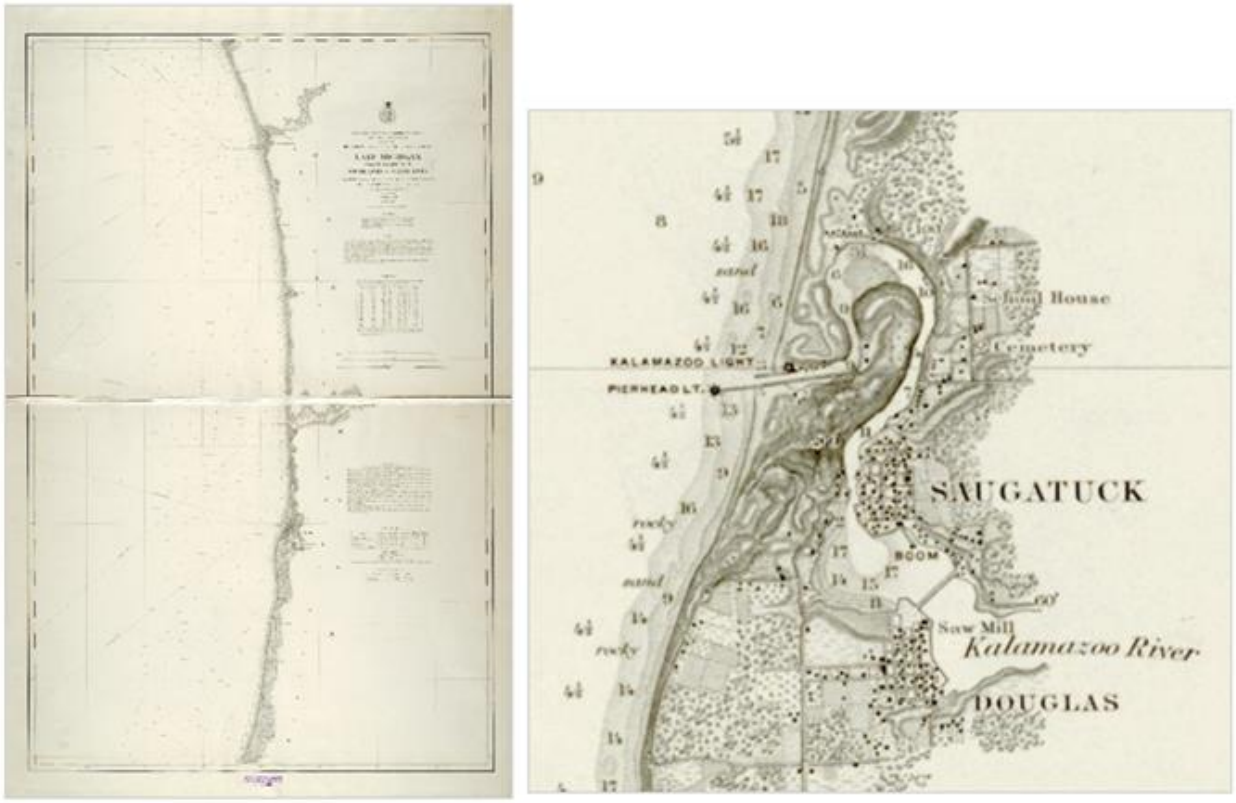

Figure 25. Lake Michigan South Haven to Grand Haven with zoomed in map of Singapore, 1877 (Source: NOAA, n.d.).

Figure 26 is a compilation of nautical maps created by the National Oceanic and Atmospheric Administration (NOAA, n.d.) in 1876, 1889, and 1905 after the town was deserted. The maps are accessible via the Coast Survey's Historical Map and Chart Collection Portal (https://historicalcharts.noaa.gov/). These maps cover the south end of Lake Michigan. They each include an insert of Singapore. In each of these maps Singapore is not labelled. However, the layout of the roads as they once were are shown indicating that a town once stood there.

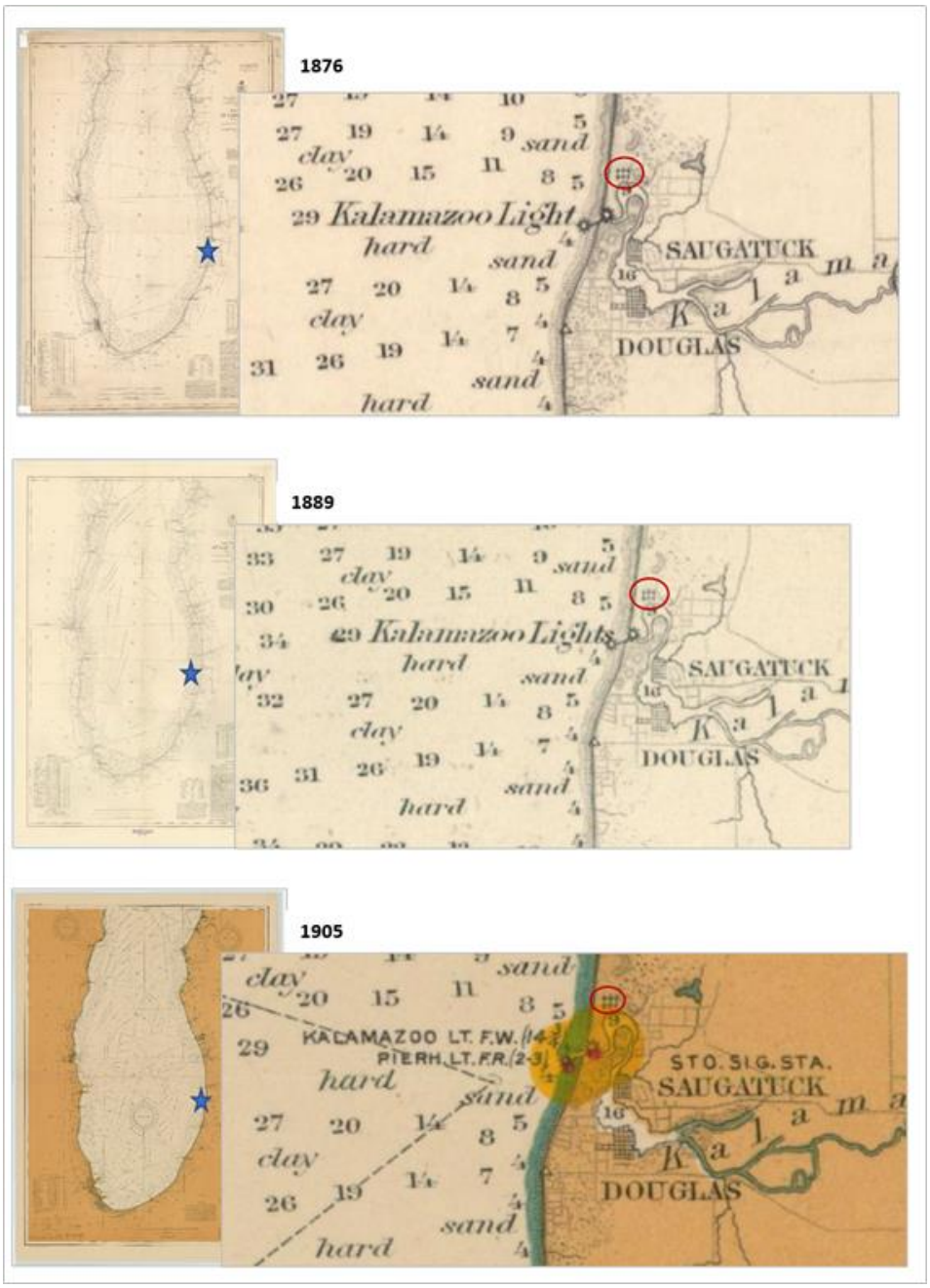

Figure 26. Three maps of the South end of Lake Michigan, each including an insert of Singapore. (Source: NOAA, n.d.)

Figure 27 (below) is a map of Saugatuck Township created in 1895. This map does not include Singapore. There are no building footprints or roads laid out. Compare this map to figure

23 that was created in 1873. The 1873 map shows the town, the roads, and buildings. Two years later the town was abandoned and removed from maps such as this one.

Figure 27. Map of Saugatuck Township, 1895 (Source: Kace Publishing Company, 1895).

Comparing figure 26 (south end of Lake Michigan with inserts of Singapore) to figure 28 (below) we see marked differences in these nautical charts also sourced from NOAA's Historical Map and Chart collection (https://historicalcharts.noaa.gov/). While figure 26 did not name Singapore, road lines indicate that it was there. Figure 28 is a set of nautical charts, created by the Army Corps, that do not indicate that Singapore was ever in existence. One of the maps below, 1909, was drawn after the 1905 map in figure 26 that did include a layout of Singapore.

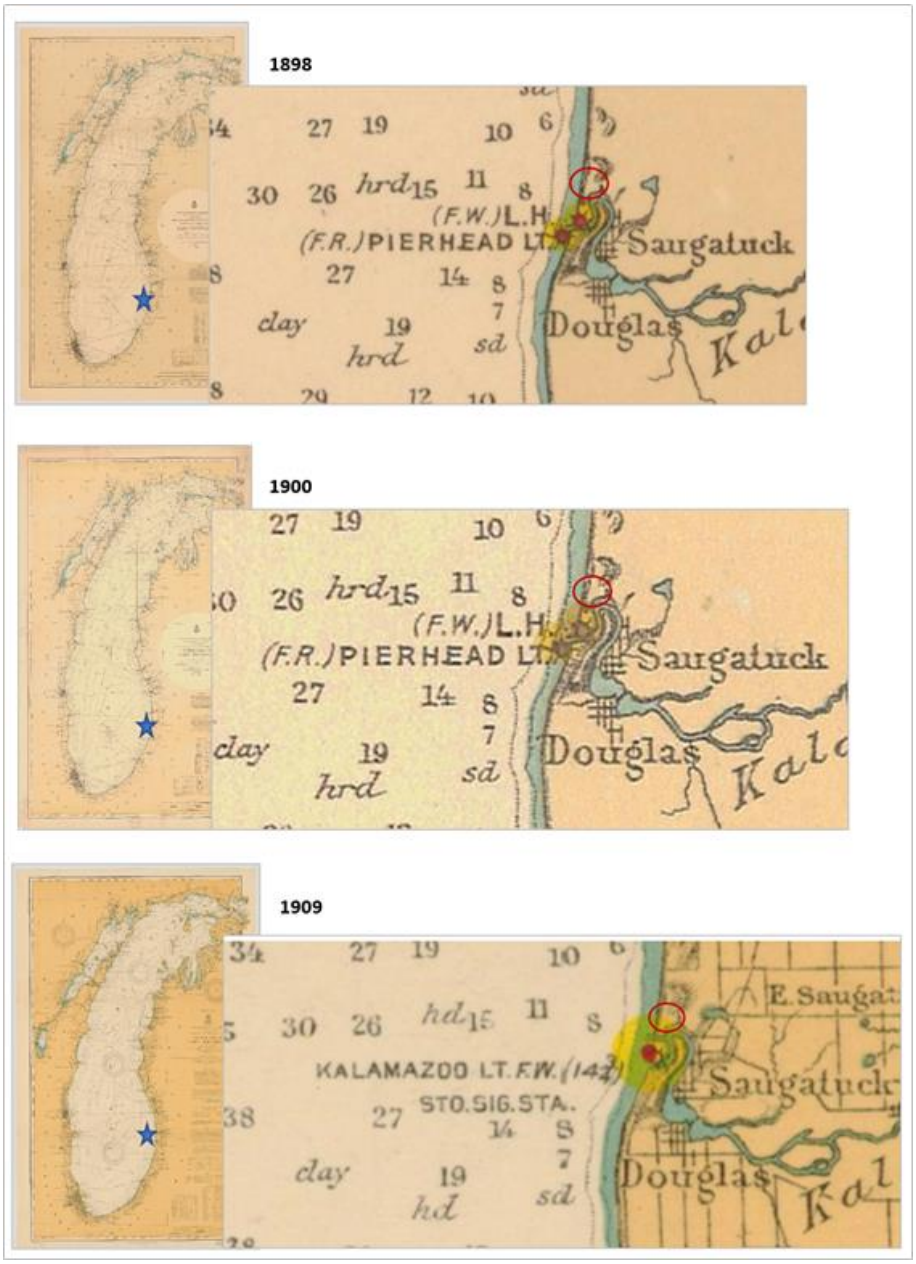

Figure 28. Three nautical charts titled "General Chart of Lake Michigan". Each of these three maps includes an insert zoomed in on where Singapore once stood (Source: NOAA, n.d.)

Maps as late as 1919 and 1934 still show evidence of Singapore, as shown in figure 29 (below). A new channel near the northern bend of the Kalamazoo River was completed in 1906 and the old harbor has since been blocked by a sand dune. However, in these two maps, there are

still indications of buildings remaining along the northernmost bend of the Kalamazoo River where Singapore once located.

Figure 29. Lake Michigan and Saugatuck Harbor. These nautical charts give evidence, footprints of buildings, that Singapore was once located on the northernmost bend of the Kalamazoo River (Source: War Department, n.d.).

Today Singapore is not on the map; however, the area that was once a booming lumber town is undergoing change once again (figure 30). There is an effort to develop the area and whether this is successful remains to be seen. Right now, the area that was Singapore remains buried and deserted. Figure 30 (below) is a 2019 rendering of Saugatuck Township, comparable to figures 22 and 27. This map does not recognize Singapore, instead there are plans for future properties outlined.

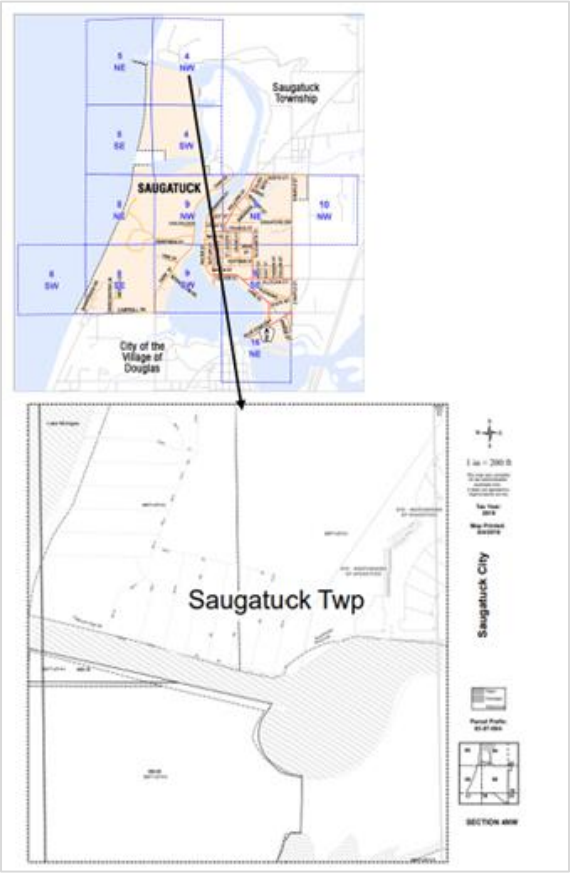

Figure 30. Saugatuck Township, 2019 (Source: Allegan County GIS Services, 2019).

4. DISCUSSION

This research set out to explore the concept of settlement abandonment due to natural resource depletion. Utilizing a model developed by Riis (1973), Singapore, Michigan was used as a case study to test its applicability to other locations. Photographs were evaluated for evidence of the key components of the Riis model and evaluated through a visual methodological approach. Understanding the interactions between humans and environment in the abandonment of Singapore is important as threats to infrastructure due to abnormally high Great Lake's lake levels have become increasingly important the past several years.

In the mid-nineteenth century, Michigan played a key role in providing lumber to a growing nation. As the demand for lumber rose, logging activity intensified as settlers began to move farther away from Detroit, and timber was leaving the shores of Lake Michigan for Chicago to meet the rising needs for lumber on the prairies (Cronon, 1992b; Hupy & WinklerPrins, 2005; Steinberg, 2013). The impacts of this logging activity were twofold. One, it helped the migrating population by providing much needed lumber. Two, it depleted vegetation leading to increased erosion. After the land was deforested, the town was abandoned and buried under a sand dune. Leaving the community and environment barren. Riis' model helped explain how certain variables were able to impact this town and cause its desertion.

The concept of settlement abandonment helps understand the drivers behind the desertion of Singapore. According to Nelson & Schachner (2002), settlement abandonment occurs when there is an absence of habitation of any magnitude or duration in a site of previous habitation. Environmental related settlement abandonments are generally not random products of uncontrollable or unpredictable events but are outcomes that emerge from conditions of

heightened vulnerability (McLeman, 2011), in this case, the lack of land cover leading to sand blowing into the town and burying it. The model created by Riis (1973) was used to identify and analyze the critical factors associated with the settlement's decline and eventual abandonment. This model examined cultural factors along with site constraints and human adjustments. The culture around Singapore in the mid-nineteenth century revolved around cutting and milling the lumber. Shipping was also a part of Singapore. The ships came in from Lake Michigan, loaded up the lumber that had been cut and milled, then turned back around and took its load to Chicago or Milwaukee. However, site constraints were also significant variables that were considered. The forests, Lake Michigan, and the coastal dunes all played a role in the abandonment of Singapore. By clear cutting the forests, the wind blowing across Lake Michigan moved the sand inland ultimately covering the town. Environmental conditions (such as these) are recognized as having a significant influence on human migration and settlement patterns (McLeman, 2011). Once the fate of Singapore became apparent, the ultimate human adjustment, abandonment, occurred.

Settlement abandonment is one potential outcome from human-environment interactions. Environmental history by its very nature deals with the role and place of nature in human life (Worster, 1990). And the task of environmental history is the study of human relationships, through time and is subject to frequent and often unexpected changes (Hughes, 2016). As such, scholarship in environmental history over the past few decades has demonstrated that the histories of human societies and the natural world are intricately enmeshed (Stroud 2003). Combining this with Riis' model, this research was better able to understand how humans have been affected by their natural environment through time, and given the present global predicament, how they have affected the environment and with what results. What we wanted in

the past had consequences that no one expected along with surprises, unpredictable outcomes, and many disappointments, some of them tragic (Worster, 1994). Examining Singapore, Michigan gave a clear understanding the effect humans have on nature. In 1831, the area around Singapore was forested. In a letter Oshea Wilder wrote to Knowles Taylor, his investor, he stated that the plot of land that was to be Singapore: "The west half of the town plot is a handsome plain inclining to the river. The east part is a hill and covered with timber" (Lane, 2010). By 1875, the forests were gone. And by the late 1800's the town was buried in sand. The town being buried in sand was a direct result of the clear-cutting that had occurred. Without the trees to stop the sand from blowing toward the town, there was no stopping nature from taking its course.

Visual analysis of photographs and maps of Singapore were used as evidence of the environmental conditions of Singapore. Photographs are used to illustrate the past, they offer a widely accepted form of communication for the present and are an important reference for the future (McLaughlin, 1989). Using Riis' model, the environment (site constraint) and human adjustment (abandonment) are clearly portrayed. The photographs indicate what happens when a natural resource is depleted and what happens to the area around it. With no trees to protect it, the town was buried in sand. The photographs show the regression of forests around the town and then the progression of sand dunes that overtook it. Using visual methods allowed a view that we would otherwise not get to experience, oftentimes vital information is revealed that would not otherwise be available to the researcher (Borchert, 1982). The first photograph explored (figure 4) showed a bustling port. The lumber was piled up, ready to head out to distant destinations. The rest of the photographs show nothing more than sand and the lack of vegetation. Without photographic evidence, the busyness of the port, the amount of lumber, and the scale of the operation would not be readily available. Maps gave an insight as to when Singapore was forgotten. In 1873, two years

before it was abandoned, Singapore was included in an Atlas of Allegan County compiled by H.F. Walling in 1873. In this map, Singapore was shown at the county level, the township level, and at the city level (see figures 22, 23, and 24). In the city map, there are roads labeled and footprints of buildings. In the next Atlas of Allegan County in 1895 compiled by Kace Publishing Company (see figure 27) Singapore is not included at any level. However, in nautical maps of Lake Michigan, footprints of the buildings in Singapore were included as late as 1934 (see figure 29).

Historical research is limited in its ability to fully capture the complexities of the past and is open to interpretation. Worster (1990) stated that the greatest challenge in history is in deciding how and where to make connections. The availability of resources in the case of Singapore was a major limiting factor of this research. Singapore was never incorporated as a town; it was strictly a company town without any kind of local government below the level of township (Lane, 2010). There are very few artifacts that survived, fewer original documents exist, and only a handful of personal narratives were maintained. Given this lack of documentation, photographs became an important visual reminder of the force of nature. Being mindful and creative of where and what is studied is one way of overcoming the limitations of historical studies. Overlapping text along with photographs and visual materials is an adjustment that can be made to help decrease the gaps in the study. As limited as historical materials are, studying the past allows a window for reflection. It allows us to reflect on what went right and what went wrong in order that we do not make the same mistakes our ancestors made.

This work showed the consequences of technological and social progress. As the nation's population was moving westward and needed lumber, Singapore happily provided it, but at an environmental cost. Riis' model provided a guide to frame the interpretation of photographs and maps of the town and thus create new knowledge about how the town got to the point of no-

return. Much of the previous work on settlement abandonment, such as the work by Stevenson (1982) that examined the behavior of the town's residents and McLeman (2011) that worked with spatial and temporal patterns to create a typology that summarized environmental and non-environmental drivers common in settlement abandonment, may also be applicable to our understanding, however, these aspects are outside the limits of this current research and we suggest that future work address those factors.

5. CONCLUSION

In 1837 a lumber town was established near the shore of eastern Lake Michigan. Less than forty years later it was gone. From a booming lumber town to a town buried under sand. This was a town with a school, a hotel, several houses, and sawmills. As the landscape was stripped of timber, Singapore, Michigan became another boom-and-bust town.

The need for lumber rose in the mid-nineteenth century as the population moved west. Settlers on the plains needed lumber for houses, fences, and heat. As the population grew, the need for quality lumber increased. Logging activity intensified as settlers began to move farther away from Detroit, and timber was leaving the shores of Lake Michigan for Chicago to meet the rising needs for lumber on the prairies (Hupy & WinklerPrins, 2005).

Between May 22 and June 26, 1839, the sawmill in Singapore cut 307,861 board feet of lumber (Lane, 2010). Further, in the early 1870s the schooner, O.R. Johnson carried over six million board feet of lumber to Chicago in fifty-seven trips (Schmiechen, 2010). In addition, during the period of 1837 to 1875, Singapore provided lumber that helped build and establish towns up and down Lake Michigan.

To be fair, the people during this time did not understand the consequences of their actions. They did not understand that there was a limit to the forests around their town. They saw a need that they could fulfill, and they did. However, doing so was their downfall. In 1873 Henry Francis Walling postulated that “we must dismiss all present fear as to the duration of our pine supply. It will continue to be the chief source of our wealth and prosperity for many years and to compensate for the increased cost of lumbering, because of the long hauling of logs, we shall have the constantly advancing price of lumber, caused by the augmented demand.” (Walling, 1873).

If we try to draw up a balance sheet of the positive and negative aspects of forest clearing, then the following is clear: the forest supplied the raw material for industrial growth during the late 18th and most of the 19th centuries. The forest that was cleared supplied the land that has supported the agriculture that has made America the foremost food producer in the world, and the lumber has provided cheaply the houses and helped the means of transportation that are major features of American life. The forest has other attributes. It and the pioneer farmer or backwoodsman have provided potent symbols of American life and ethos in terms of self-sufficiency, effort, and practicality. It is a great esthetic and leisure resource, to indulge in recreation out-of-doors means going into the woods for most Americans (Williams, 2010).

The mill towns that fed Chicago's market were all to the west of Saginaw, Michigan, and were scattered along the shores of Lake Michigan at places like Grand Haven, Ludington, Traverse City, and others whose names are now forgotten (Cronon, 1992b). Singapore, Michigan was a town that very few people know about. It was a thriving town in its time. There are many towns like Singapore, not only in Michigan but world-wide that were once thriving but are no more. Many of these towns were abandoned due to natural resource depletion. These towns have all but been forgotten. Most people have not heard of the town on the west coast of Michigan once called Singapore. Future study into these abandoned settlements is needed to bring an awareness that our actions have consequences. There are now regulations in place in the United States to prevent this mass destruction from reoccurring. Because of these regulations, we know the clear-cutting of the land will not occur. If we explored the ecology of the area in more detail or examined the climate for potential climate change, would we be able to understand settlement abandonment differently? Not only for Singapore but for other areas that natural resource depletion was the cause for abandonment. It is my hope that the lessons learned from this study will be a reminder of the

destructive forces we humans can have. Environmental history is sometimes about power, sometimes about place, occasionally about space, and more rarely about all three, but it is always about nature (Stroud, 2003).

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